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ABSTRACT

Three studies of children at two developmental levels were made to assess subjects' understanding of the verbal terms "easy" (to do) and "hard" (to do). Such understanding was studied in the context of statements about personal competence at depicted activities. Behavioral criteria of levels of understanding were employed; these criteria were independent of the accuracy or realism of the child's self-evaluations. For the 3- and 4-year-old children in the first two studies, the external consistency of easy/hard assessments with responses to the terms "can" (do) and "can't" (do) was examined. At the higher developmental level explored in the third study, internal dimensional consistency was examined in 5- and 7-year-olds' understanding of the terms. Findings at both levels matched the developmental sequence postulated by Heckhausen (1982) for the child's acquisition of concepts associated with achievement-related behavior. Results were not consistent with the positives-first prediction of the semantic feature hypothesis. (Author/RH)

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Development of Children's Understanding of the Concepts
"Easy" and "Hard" in Judging Task Difficulty

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Abstract

An investigation at two developmental levels was made of young children's understanding of the verbal terms "easy" (to do) and "hard" (to do) in the context of statements about personal competence at depicted activities. Behavioral criteria of levels of understanding were employed which were independent of the accuracy or realism of the child's self-evaluations. For the 3- and 4-year-old children in Studies 1 and 2, the external consistency with responses to other terms, "can" (do) and "can't" (do), was examined. At the higher developmental level, in Study 3, internal dimensional consistency was examined in the understanding of the terms by 5- and 7-year-old children. The findings at both levels matched the developmental sequence postulated by Heckhausen for the child's acquisition of concepts associated with achievement-related behavior. The results were not consistent with the positives-first prediction of the semantic feature hypothesis.

The acquisition by children of concepts of their own capabilities is of particular interest in research on the development of an orientation towards achievement (Heckhausen, 1982; Nicholls and Miller, 1983; Nicholls, Jagacinski, and Miller, Note 1; Ruble, 1980). The child's understanding of verbal terms denoting these concepts has not received attention in studies of the acquisition of word meanings. This is an oversight of some significance when it is considered that a number of studies of the development of young children's attributions for achievement have depended upon the child's understanding of verbal terms such as "hard", "easy", "can", and "can't" when referring to a task or activity (Falbo, 1975; Nicholls, 1978, 1980; Shaklee, 1976).

The aim of the present studies was to examine the child's understanding of such verbal terms in the context of statements concerning self-evaluation of competence with physical tasks. The intention was to assess at two developmental levels the child's degree of understanding of the terms "easy" and "hard". The levels selected were those corresponding to two successive stages in the development of concepts of competence and task difficulty. The stages are part of a sequence postulated by Heckhausen (1982) for the development of concepts related to achievement behaviors. However, the present concern is with the child's understanding of these two verbal terms in the self-evaluation context and not with the issues of attribution or other theories of achievement orientation. The studies were also designed to consider the order of acquisition of understanding of the terms "easy" and "hard" within the context of self-evaluation and competence,

Study 1

An early level in the developmental sequence postulated by Heckhausen is the acquisition by children of a concept of their own capabilities. This is a rudimentary and diffuse concept in which there is little differentiation between notions of ability, task difficulty, and effort. Heckhausen uses the label "competence" to denote this diffuse concept. The self-evaluation of competence is considered to be established in the majority of children by the age of 3 1/2 years, though the emergence of this developmental advance does not imply that children are realistic in their early self-evaluations (Heckhausen, 1982).

In the present research, the child's rudimentary understanding of personal competence was considered to be demonstrated by some comprehension of the general sense of the terms "easy" and "hard", rather than by the accuracy or realism of the self-evaluations involved. This comprehension was tested by examining the child's ability to demonstrate an understanding of the terms as denoting core features of the concept (Smith and Medin, 1981) at this rudimentary level.

A behavioral criterion of understanding of the terms, in a manner congruent with this core, was used, which was the consistency of response to at least two lexically distinct terms having a well-defined semantic relation involving the core. In the present case, concerning the concept of competence, consistency was expected between responses to "easy"/"hard" (to do the task) and "can"/"can't" (do the task). Such external consistency was assessed for "easy" and "hard" in paired comparative evaluation by constructing pairs on the basis of prior responses to "can" and "can't" obtained in categorical evaluations. Following the developmental sequence postulated by Heckhausen, it was predicted that by the age of 3 1/2 years children would have enough understanding of a concept of personal competence to be able to make consistent responses on the paired comparative evaluation task.

A different expectation, however, would derive from the positives-first prediction of the semantic feature hypothesis (Blewitt, 1982; Clark, 1973). For the feature of "difficulty" the term "hard" would represent the positive pole of this adjective pair. This ascribed polarity is based on the criterion of psychological salience, greater difficulty being of higher salience than lesser difficulty. By the positives-first hypothesis it would be expected that understanding of "hard" (to do) would be acquired before "easy" (to do).

Method

Subjects

There were 20 children aged 3-0 to 3-11, and 16 children aged 4-2 to 4-11. The mean age of the 3-year-old group was 3-6 (SD = 3.6 months) and of the 4-year-old group was 4-6 (SD = 3.1 months). The subjects attended two preschools in an urban area of New Zealand and were predominantly white and middle class. All were native speakers of English.

Materials

A set of 20 illustrations of preschool children engaged in various activities was prepared after preliminary testing with several children. In each illustration one child of indeterminate sex was portrayed. Scenes were chosen to represent activities which most preschoolers can do as well as activities rarely accomplished by children of this age. Activities portrayed were: playing in a sandpit, swinging, painting, playing with blocks, picking flowers, climbing on a jungle gym, doing a headstand, picking up an insect, looking at a book, doing acrobatics on a bicycle, lighting an open fire, sailing a boat, building a table, dancing, phoning a friend, carrying groceries home, baking cookies, riding a horse, playing the guitar, and petting an elephant. There was also a supplementary set of three illustrations assumed to represent further "difficult" activities (walking on top of a fence, shooting with a bow and arrow, riding

a skateboard with one foot). These were added to the list after pilot testing revealed that there was some tendency for the 3-year-olds to make positive responses to all the other pictures. Each illustration was a black and white line drawing on a 13cm x 13cm card.

Procedure

The categorical evaluation task and the comparative evaluation task were administered individually by the author in the children's preschools, each task on separate days no more than a week apart. In the first session, after rapport had been established with each child, the categorical task was administered. In this task the child was instructed that "a girl/boy like you doing things by herself/himself" would be shown, and they would be "doing some things you can do and some things you can't do". The child was asked to make an evaluation for each picture, and told that "things you can do" would be put by the tester into one pile while "things you can't do" would be put into another pile. The left-right orientation of the piles was varied randomly from child to child. The child was shown the 20 pictures one at a time and asked, "Is this something you can do, or is it something you can't do?". Children usually gave a response using the words "can" or "can't". If the child responded "yes" or "no" the tester probed further to determine whether the child was making a "can" or "can't" response. If, after being shown all 20 pictures, the child had indicated fewer than four pictures as "can't" activities, the additional set of three pictures was presented to the child. This was required for five of the 3-year-olds and seven 4-year-olds.

Only those children who had discriminated at least five activities as "can't do" activities on the categorical evaluation task were presented with the comparative evaluation task. In this task the child made evaluations for pairs of the illustrated activities, the pairs selected on the basis of the individual child's responses in the first task. To construct the item pairs, one of the pictures previously evaluated by the child as a "can do" activity was randomly selected and paired with one of the "can't do" items. Further pairs of "can do" and "can't do" items were similarly selected until a maximum of eight pairs was designated. The pairs of pictures were put into an 8-page, clear plastic booklet from which one pair of pictures was shown at a time. Left-right ordering of the pictures within each pair was randomly varied for each child, with the constraint that half the pictures classified by the child as "can do" activities were on the left.

The children were instructed that they would be shown "some pictures like the ones you saw before", but that this time they would have to decide which activity "is an easy/hard thing for you to do". Half the children were randomly assigned to the instruction "hard", the other half to "easy". For each pair of pictures shown, the child was asked, "which

is the easy/hard thing for you to do?" and the child pointed to one of the pair. Then the child was asked why that choice had been made. If a child hesitated to make a choice, saying that both activities were easy/hard, the tester probed by asking, "Which is the really easy/hard thing for you to do? Is one a little easier/harder than the other?"

Results

The results for the categorical evaluation task are shown in Table 1. Of the 3-year-olds, 30% showed no discrimination

Place Table 1 about here

in their responses to the task of evaluating their competence at the depicted activities. They categorized all 23 depicted activities as those "I can do", or in the case of one child, as those "I can't do". Most of the 4-year-olds showed some discrimination.

The 25 children who evaluated at least five activities as those which "I can't do" were administered the paired comparison evaluation task. There were 13 children (seven 4-year-olds) assigned to the term "easy" and 12 children (six 4-year-olds) to the term "hard". The number of paired comparisons presented varied from five to eight, according to the degree of discrimination shown by the child on the previously administered categorical evaluation task. The response to each paired comparison item was scored according to whether it showed external consistency with the response made to the categorical task. For example, the response that activity A in the pair A,B is "hard to do" is externally consistent if A had previously been categorized as an activity which "I can't do" and B as one "I can do". The percentage of item pairs evaluated with such external consistency was determined for each child. The 3-year-olds had a lower percentage of consistent responses to pairs than did 4-year-olds in both the "easy" ($\bar{X} = 68\%$ and 88% , respectively) and "hard" judgment groups ($\bar{X} = 64\%$ and 74% , respectively). A test of the age difference in scores was not considered meaningful, since the result would only be representative of those 3-year-olds with sufficient discrimination in their responses on the categorical task to be presented with the paired comparison task. As most of the 4-year-olds showed some discrimination, such subject selection was only a minor influence for their age group. The latter showed quite high consistency, with a mean external consistency score of 81% , clearly beyond the random response level, $t(12) = 7.45$, $p < .001$, one-tailed. The 3-year-old children showed some consistency, their mean external consistency score being 66% , which was significantly greater than the random response level of 50% , $t(11) = 2.13$, $p < .05$, one-tailed. Two planned comparisons were carried out to examine "easy"/"hard" effects. There was no significant

difference between mean scores of the "easy" and "hard" groups, $F(1,23) = 1.35$, $p > .05$, and no significant interaction effect between age group and "easy"/"hard" group, $F(1,23) < 1$.

Discussion

The results indicate that a degree of understanding of both the terms "easy" and "hard" in the context of self-evaluation of competence emerges at 3 years of age and is established by 4 years for the majority of children sampled. There was no support for the positives-first hypothesis (Clark, 1973), as the term "hard" was not acquired before the term "easy". And certainly there was no indication that "hard" was understood while "easy" was semantically confused with "hard". If this had been the case, the external consistency score for "easy" would have been lower than that for "hard", but the results showed that scores for "easy" were higher than that for "hard", though the difference was not significant.

The findings are based on an external consistency criterion of understanding of the terms. By the procedures employed, this criterion in fact requires temporal stability of responses over two or three days, as well as consistency. The criterion also requires a comparative response for "easy" and "hard". A categorical response may have made a less stringent criterion.

The findings would indicate that the degree of understanding of both "easy" and "hard" in this context emerges in development closely following initial understanding of "can" and "can't". Nevertheless, such a conclusion would presuppose that the discrimination criterion is a satisfactory indicator of an early level of understanding of "can" and "can't" in this context. The purpose of Study 2 was to provide a more stringent test of the suitability of the criterion.

Study 2

It could be argued that most of the children in Study 1 who failed to discriminate on "can" and "can't" were responding with a bias which was a result of recognizing the negative in "can't" and avoiding a response to that negative, although without a full understanding of the concept being negated. This explanation implies that children who did not discriminate were without understanding of "can" and "can't". There are, however, other plausible alternatives. One is that the child who failed to discriminate on the task had some understanding of the terms, but since it conflicted with a response bias concerning negatives, any ability to make a correct discrimination was masked. If this were the case a reduction in the influence of such a bias would be expected if the categorization task were preceded by demonstration trials in which the child would be shown correct responses to the term "can't".

Another source of confounding which may have influenced the category discrimination results in Study 1 was the children's possible failure to distinguish between carrying out the depicted activity on their own and participating in that activity when conducted by an adult or carried out jointly with an adult. Although the illustrations used in Study 1 depicted only a single child engaged in the activity, such an understanding by the child was not precluded. In fact, there were instances in Study 1 when children responded by mentioning an activity carried out jointly with an adult; for example, "We made cookies at kindergarten yesterday". In these instances the tester asked whether the children were able to perform the activity by themselves. Some children gave affirmative replies, suggesting that in their responses they were not separating their individual actions and outcomes from those of others involved in joint activities suggested to them by the illustrated activity. Study 2 was designed to examine the categorical evaluation task of Study 1 under conditions which would reduce any influence from these two sources of confounding, if such an influence were present. Practical demonstration trials were introduced and the illustrated activities were selected to reduce ambiguous interpretations by the children.

Methods

Subjects

There were 14 3-year-old children in the study, with a mean age of 3-6 (SD = 2.7 months). Children were drawn from two preschools, different to those of Study 1, in an urban area of New Zealand. The children were predominantly white and middle class, and all were native speakers of English.

Materials and Procedure

For the present study, only illustrations from the set of 20 chosen by a majority of children in both age groups of Study 1 as "can do" or "can't do" activities were retained. These items were the first 13 listed in the set of 20 described earlier. Two illustrations were made more explicit to take into account comments from the children in Study 1. An additional three items depicting activities unlikely to be in a preschooler's repertoire (driving a car, climbing a very large tree, putting up wallpaper) and three practice items were added after pilot-testing with two young children. Thus, a set of 16 test illustrations was used, consisting of eight depicted activities plausible for preschool children (all activities being available at the preschools visited) and eight activities unlikely to be performed by preschool children.

The task was administered by the author in similar conditions to those of Study 1. A demonstration trial was first given which involved an actual task the child had to perform. The tester showed the child a small bottle and two

different-sized coins, only one of which would fit through the neck of the bottle. The child was asked whether the smaller coin "can go into the bottle". Then the child was asked the same question about the larger coin, and asked to try to put it into the bottle. The tester commented that the coin "cannot" be placed in the bottle. The tester then showed the child a 20cm rubber ball and a round, 20cm - diameter straw hat. The child was asked whether each of these items can be balanced on the child's head. This activity was demonstrated for each object by the tester, before the object was passed to the child to try. After the child had tried unsuccessfully to keep the ball in place, the tester said, "You see, you can't keep the ball on your head." Then it was pointed out to the child that the hat "can" be balanced on the head.

Next, three practice illustrations were shown to the children. The first was a picture of a child pouring catfood into a container for a cat, and children were asked whether they "can do" this. Then a picture of a child with a ball falling off the head was shown and children were asked, "Can you keep the ball on your head?". Children who said they "can" were corrected and told that they cannot do this. Children who responded "can't" were told, "That's right. You can't keep the ball on your head." Next, a picture of an astronaut walking on the moon was shown. No feedback was given to children regarding their responses to this picture. The instructions and procedure used in showing the children the set of 16 illustrations which followed were the same as those used for the categorical evaluation task in Study 1.

Results and Discussion

Four of the 14 children failed to discriminate any activities as those which they "can't do". Thus, the proportion of 3-year-olds failing to discriminate was the same in both studies 1 and 2. There was no depicted activity that elicited "can't" responses from all children. Only four children said that they would be able to perform acrobatics on a bicycle, whereas 10 of 14 children said that they would be able to play in the sandpit, paint a picture, or look at a picture book. Children's self-evaluations of competence apparently varied greatly between children.

The addition of practical demonstration trials of correct usage of the terms and refinement of the selection of illustrated activities still gave a result of discrimination for "can" and "can't" in the categorical self-evaluation task which was similar to that in Study 1. Hence the results of Study 2 do not give any reason to modify the tentative conclusion that a degree of understanding of both "easy" and "hard" emerges in development closely following initial understanding of "can" and "can't" in the context of self-evaluation of competence.

However, one other alternative remains to be considered. This is the possibility that the failures of discrimination for "can" and "can't" represent a bias of positive self-enhancement or exaggerated belief in personal competence (Stipek, Note 2). This is not a case of a separate bias conflicting with and overriding a discrimination based on an understanding of the verbal terms in this context. The bias of self-enhancement resides in the application of understood terms; the bias presupposes that the child already understands that the terms denote personal competence. Hence, to maintain that the failures of discrimination were due to positive self-enhancement would imply that 3-year-olds understand the terms but that this understanding is masked, and not apparent in responses to the self-evaluation task, until such time as positive self-enhancement declines. The question remains whether any such decline occurs between 3 and 4 years of age that would account for the discrimination which most 4-year-olds were able to make in Study 1.

Study 3

The next level in the developmental sequence postulated by Heckhausen (1982) is not reached until 5 years of age. At this level the child differentiates from the diffuse concept of competence a stable concept of degree of task difficulty. This would imply that, for tasks or activities which the child is able to distinguish in difficulty, the child would be able to provide an ordering of the activities on a dimension of difficulty. It was predicted that at this developmental level the child's understanding of "easy" and "hard" would entail such a stable dimensional ordering. This expectation was assessed by obtaining the child's paired comparison evaluations of depicted activities, using the terms "easy" and "hard". The transitivity of the comparative evaluations was then taken as a behavioral criterion that the child's understanding of the terms demonstrated a dimensional ordering of at least short-term stability.

Method

Pilot Study

Before construction of the Study 3 stimulus materials, a pilot investigation with two 3-year-olds, two 4-year-olds, and two 5-year-olds was conducted. Two sets of four illustrations graded in a priori difficulty were administered by the procedure outline below. Only one of the children was able to respond without intransitivity, a 4-year-old with a mental age of 7 years. For this reason, 5- and 7-year-olds only were tested in Study 3.

Subjects

There were 20 children aged 5 years and 20 aged 7 years in the study. The mean age of the 5-year-old group was 5-9 (SD = 2.6 months) and of the 7-year-old group was 7-2 (SD = 2.1 months). The subjects attended an elementary school in an urban, middle class area of New Zealand. They were predominantly white and all were native speakers of English.

Design, Materials and Procedure

The method was designed to provide, within a manageable number of paired comparisons: (1) sufficient opportunities for intransitivities to occur, (2) replications over items, and (3) a spread of degrees of evaluated difficulty among the items sufficient to avoid inducing intransitivities because items were indistinguishable in difficulty. There were three replications, each with a different set of four items. Within each independent replication there was a full set of paired comparisons, comprising six pairs of items. In total, 18 pairs were presented, covering the three replications of sets of items. There was opportunity for a maximum of six intransitivities to occur in responses to these 18 pairs (two intransitivities per replication). The probability of zero intransitivities occurring over the three replications by random responding is $(.375)^3 = .05$, as determined by Kendall (1955, p.147).

The activities were depicted by black and white line drawings of a child of indiscriminate sex performing the activity alone. The drawings were on 13cm x 13cm cards. A set of 12 such illustrations was constructed to represent four a priori levels of difficulty with three illustrations at each level, one illustration for each replication. The four levels were selected by reference to normative difficulty for people of different ages. The three pictures from Study 2 chosen by most 3-year-olds as within their capabilities (swinging, climbing a jungle gym, playing with blocks) were taken as the lowest difficulty level. Pilot testing of materials with adults and reference to choices of items in Studies 1 and 2 produced three additional difficulty levels: at the second lowest difficulty level were activities commonly carried out by older children (baking cookies, picking up a large insect, climbing a tree); at the third lowest difficulty level were activities usually performed by adults but not children (driving a car, sailing a boat, lighting an open fire); and at the highest difficulty level were activities performed by very few adults (flying a helicopter, swimming across the ocean, doing acrobatics on a bicycle). These descriptions of a priori difficulty levels of the items were confirmed by judgments of two adults and one 5-year-old asked to sort the pictures into piles appropriate to the verbal descriptions of the levels as given above. Each of the three replications of items comprised four illustrations, one randomly selected from each a priori level of difficulty.

Children were assigned to one of two groups. In one group children made all evaluations of the item pairs in response to the verbal term "easy" (to do), while the other group responded to the term "hard" (to do). An equal number of 5- and 7-year-olds was randomly assigned to each group.

The task was administered to the children individually by the author in a quiet room at their school. The session took approximately 15 minutes. The 18 pairs of items were separately randomized for each child for order of presentation and left-right positioning. The pairs of items were presented to the children in clear, plastic booklets. Children were asked to choose the item in each pair that was "the easy/hard thing for you to do". Instructions and probe questions were the same as in the comparative evaluation task of Study 1.

Results and Discussion

For random responding to all 18 pairs, there was a probability of .05 for each child that no intransitivity would occur. In the results obtained (Table 2), 11 of the 20 5-year-olds had no intransitivity in their responses to the pairs of activities. At the level of random responding only 1 in 20 of the subjects would be expected to have no intransitivity. Of the 20 7-year-olds, 16 had no intransitivity in their responses. The overall age group difference was significant, $\chi^2(1) = 2.85, p < .05$, one-tailed. The overall difference between the "easy" and "hard" groups was not significant, $\chi^2(1) = 1.03, p > .05$, two-tailed.

Place Table 2 about here

The findings indicate that by 5 years of age a degree of understanding of both the terms "easy" and "hard" is emerging which entails a dimensional ordering of at least short-term stability. It may be surprising that so many children as young as 5 years made comparative evaluations with an incidence of intransitivity below the random response level. Bradbury (1975) reported on the level of intransitivity in comparative preferences for colors. In that study, total intransitivity did not fall below the random level until age 9. In the present study, the incidence was below the random level at age 5. The "novelty effect" which apparently induced intransitivity for the younger children in the Bradbury study may be more influential in color preferences than in the evaluations made in the present study. This would be understandable if young children's color preferences show less stability than their evaluations of personal competence at activities. Certainly, color preferences would not seem to

involve concepts of the self to the same extent as the evaluations made in the present study.

There was a wide variation between children in the transitive orderings which were assigned to the depicted activities by the comparative evaluations given. For example, over both "easy" and "hard" groups, there were nine different orderings in the 7-year-olds' evaluations and seven different orderings in the 5-year-olds' evaluations of one of the sets of four activities.

General Discussion

The present research has examined the development of children's understanding of some verbal terms denoting concepts associated with achievement-related behavior. The child's understanding of the terms "easy" and "hard" involves relationships between concepts about personal competence and concepts of the activities or task. Understanding involves the relationships between these two sets of concepts expressed in propositions. The present studies have examined the child's understanding of the terms in the context of particular propositions only. While the generality of the responses over a range of depicted activities was examined, a more extensive attempt was not made to examine the influence of variations in the propositional contexts of the terms, not of decontextualization of the terms. Within this limitation, the results indicate levels of understanding of the terms which match each of two successive developmental levels postulated by Heckhausen (1982) for the development of concepts relating to achievement.

The results indicate that at the earlier developmental level understanding of both "easy" (to do) and "hard" (to do) is established by 4 years of age, closely following the initial understanding of "can" (do) and "can't" (do). In the comparison of the results for "easy" and "hard" there was no support for the positives-first prediction of the semantic features hypothesis (Clark, 1973). At the subsequent developmental level there was evidence as early as 5 years of age for the emergence of a degree of understanding of both the terms "easy" and "hard" which entails a dimensional ordering.

The criteria of understanding employed at each level did not depend on the accuracy or realism of the child's evaluations. For the early level the criterion was external consistency with responses to other terms, and at the subsequent level it was internal dimensional consistency. Both these behavioral criteria for level of understanding are applicable even in the present cases, where there was very wide variation between children in their categorization of competence at activities (Study 2) and in their transitive orderings of evaluated difficulty (Study 3). Although consistency of evaluations between individuals may be important to investigation of their understanding of terms denoting concepts of physical objects, it is not the case for self-evaluations of competence which

would be expected to vary widely between individuals. The study of children's understanding of verbal terms used in such self-evaluations requires methods which allow for very wide variation between children. The results of research in this area are an important requisite for interpretation of many developmental studies of achievement motivation.

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Table 1

Number of Children Responding at Each Level of
Discrimination on the Categorical Evaluation
Task of Study 1

	Age Group	
	3 Years	4 Years
No Discrimination		
All Activities Elicit "Can" Do Responses	5	2
All Activities Elicit "Can't" Do Responses	1	0
Some Discrimination		
1 to 4 Activities Elicit "Can't" Do Responses	2	1
> 5 Activities Elicit "Can't" Do Responses	12	13
Total Children	20	16

Table 2

Number of Children Evaluating the Pairs of Activities
Without Intransitivity for Each Group in Study 3

Responses	Group			
	5 Years		7 Years	
	"Easy"	"Hard"	"Easy"	"Hard"
No Intransitivity	5	6	7	9
With Intransitivity	5	4	3	1
Total Children	10	10	10	10